

Sleep Deprivation and Cognition



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Deficits in daytime performance due to sleep loss are experienced universally and associated with a significant social, financial, and human cost. Microsleeps, sleep attacks, and lapses in cognition increase with sleep loss as a function of state instability. Sleep deprivation studies repeatedly show a variable (negative) impact on mood, cognitive performance, and motor function due to an increasing sleep propensity and destabilization of the wake state. Specific cognitive domains including executive attention, working memory, and divergent higher cognitive functions are particularly vulnerable to sleep loss. In humans, functional metabolic and neurophysiological studies demonstrate that neural systems involved in executive function (i.e., prefrontal cortex) are more susceptible to sleep deprivation in some individuals than others. Recent chronic partial sleep deprivation experiments, which more closely replicate sleep loss in society, demonstrate that profound cognitive deficits accumulate over time in the face of subjective adaptation to the sensation of sleepiness. Sleep deprivation associated with disease-related sleep fragmentation (i.e., sleep apnea and restless legs syndrome) also results in cognitive performance decrements similar to those seen in sleep restriction studies. Performance deficits associated with sleep disorders are often viewed as a simple function of disease severity; however, recent experiments suggest that individual vulnerability to sleep loss may play a more critical role than previously thought.

Key Words: Sleep deprivation; Cognition; Sleep disorder

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